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CLAIMS

1. A method for mixing chemically reactive liquid chemical components (A, B) in the production of polyurethane foams and moulded parts, according to which a first (A) and at least a second (B) chemically reactive components are fed under pressure conditions and mixed into a mixing chamber (24), and in which the resulting mixture is made to flow towards an outlet duct 25B, comprising the steps of:

5 - feeding metered quantities of the chemical components (A, B) into a common pressure and feeding chamber (15) subjecting the chemical components (A, B) at a same pressure condition flowing in an unmixed state toward at least one restriction or orifice; and

10 - co-injecting the chemical components (A, B) feed in common, into the mixing chamber (24), through said least one injection orifice (31) causing their intimate mixing by impingement and turbulency.

2. A method according to claim 1, comprising the additional step of pre-mixing the 15 chemical components by the turbulency of the jet during the co-injection.

3. A method according to claim 1, wherein the jumbled chemical components (A, B) are co-injected into the mixing chamber (24), while maintaining in the common pressure and feeding chamber (15) a pressure equal to or higher than 30 bars (3,0 MPa).

4. A method according to claim 3, wherein the pressure in the common pressure and 20 feeding chamber (15) is ranging from 40 to 160 bars (4 to 16 Mpa).

5. A method according to claim 1, in which the mixing chamber (24) is provided with a rear open end, and a flow throttling member (29) having a shaped end axially protruding into the rear opening of the mixing chamber (24) to provide said at least one injection orifice (31), wherein the pressure of the common fed chemical components 25 (A, B) in the common pressure and feeding chamber (15) is changed by adjusting the axial position of the throttling member (15) shaped end in respect to the rear opening of the mixing chamber (24).

6. A method according to claim 1, comprising the step of post-mixing of the resulting mixture outcoming from the mixing chamber (24).

30 7. A mixing device (10) for mixing reactive chemical components (A, B), comprising;

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- a common pressure and feeding chamber (15);
- a mixing chamber (24) in fluid communication with the common pressure and feeding chamber (15) and an outlet duct (25B);
- a said common pressure and feeding chamber (15) having inlet apertures (16, 5 17) for separate feeding of the chemical components (A, B), and being conformed for maintaining the flowing of the chemical components (A, B), in common, at a same pressure and in unmixed state; and
- at least one injection orifice (31), conformed and arranged for co-injection of the chemical components (A, B), from the common pressure and feeding chamber (15) into 10 the mixing chamber (24) of the mixing device (10).

8. A mixing device (10) according to claim 7, comprising a throttling member (29) for the injection orifice (31) coaxially arranged inside the feeding chamber (15), said throttling member (29) having a fore end partially protruding into an inlet aperture of the mixing chamber (24), and conformed to provide said at least one injection restriction or orifice (31) between opposite edges of inlet aperture of the mixing chamber (24) and the fore end of throttling member (29).

9. A mixing device according to claim 8, wherein the opposite confronting faces at the bottom of the feeding chamber (15) and of the fore end of the throttling member (29) are provided with shaped surfaces defining said at least one injection restriction or 20 orifice (31).

10. A mixing device according to claim 8, wherein the throttling member (29) is axially adjustable in respect to the inlet aperture of the mixing chamber (24).

11. A mixing device according to claim 7 comprising a cleaning member (29) axially movable within the mixing chamber (24).

25 12. A mixing apparatus according to claims 9 and 11, wherein the cleaning member (29) is consisting of the same throttling member (29).

13. A mixing device according to claim 12, wherein the cleaning and throttling member (29) is movable between an advanced and a retracted position in respect to the mixing chamber (24), and means for adjusting the axial position of the throttling member 30 (29) and to change the sectional area of the injection orifice (31) at the retracted position of the throttling member (29).

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14. A mixing device according to claim 7, wherein the common pressure and feeding chamber (15) and the mixing chamber (24) are axially aligned.
15. A mixing device according to claim 7, wherein the mixing chamber (24) has a cross sectional area smaller than that of the common pressure and feeding chamber (15).
16. A mixing device according to claim 7, wherein the mixing chamber (24) opens out into a post-mixing chamber (25A).
17. A mixing device according to claim 16, wherein the post-mixing chamber (25A) is angularly oriented, with respect to the mixing chamber (24).
18. A mixing device according to claim 17 wherein the post-mixing chamber (25A) is arranged in a different plane.
19. A mixing device according to claim 16, wherein the post-mixing chamber (25) has a cross sectional area larger than that of the mixing chamber (24).
20. A mixing device according to claim 7, wherein the common pressure and feeding chamber (15) has an annular shape.
21. A mixing device according to claim 7, comprising a cleaning member (12), axially movable within the common pressure and feeding chamber (15).
22. A mixing device according to claim 21 wherein the feeding chamber (15) is provided with axially spaced apart inlet and outlet apertures (16, 34; 17, 35) for feeding and recycling of the chemical components (A, B), the cleaning member (12) for the common pressure and feeding chamber (15) comprising a spool member conformed for opening and closing said inlet apertures (16, 17), respectively for connecting said inlet apertures (16, 17) with the outlet apertures (34, 35) for recirculation of the chemical components (A, B).
23. A mixing device according to claim 22, wherein said spool member (12) comprises re-circulation slots (36, 37).
24. A mixing device according to claim 21, wherein the cleaning member (12) for the common pressure and feeding chamber (15) consists of a hollow spool member (12) having a longitudinal bore, and wherein a throttling member (29) is provided comprising an elongated pin member axially movable within the bore of said spool (12).
25. A mixing device according to claim 24, wherein the spool member (12) for clean-

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ing common pressure and feeding chamber (15) and the cleaning member (29) for the mixing chamber (24), are connected to selectively operable hydraulic control actuators (13, 30).

26. A mixing device according to claim 7, comprising:

- 5 - a body (10) having an elongated hole and a common pressure and feeding chamber (15) for the chemical components (A, B) in said elongated hole, said common pressure and feeding chamber (15) having inlet apertures for chemical components;
- a bush member (14) at the fore end of said elongated hole, said bush member (14) defining the mixing chamber (24); and;
- 10 - a spool member (12) axially sliding in said feeding chamber (15), operatively connected to a first hydraulic control cylinder (13);
- the opposite ends of the bush member (14) and the spool member (12) having reciprocally matching facing surfaces (12A, 12B; 14A, 14B; 33A, 33B).

27. A mixing device according to claim 26 wherein the opposite ends of the bush member (14) and the spool member (12) have at least one, facing surface parallelly arranged to a same slanting plane.

28. A mixing device according to claim 27, wherein said slanting plane form an angle ranging from 15° to 75° with respect to the longitudinal axis of the jumbling chamber (15).

29. A mixing device according to claim 16, wherein the axis of the post-mixing chamber (25A) forms an angle ranging from 45° to 150° with the axis of the mixing chamber (24).

30. A self-cleaning mixing apparatus for mixing at least first and second reactive polyurethane - forming chemical components, comprising: a body (10) having a first longitudinal bore (11) wherein a common pressure and feeding chamber (15) for feeding in common the chemical components (A, B) and a mixing chamber (24) are provided in said first longitudinal bore (11), the mixing chamber (24) having a rear open end provided with slanted shaped edges;

- at least first and second inlet apertures (16, 17) for the chemical components (A, B), opening into said feeding chamber (15);
- a first cleaning and spool member (12) for the common pressure and feeding

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chamber (15) slidably received within said first longitudinal bore (11) to move between a closed and an open condition of the inlet apertures (16, 17) of the feeding chamber (15);

- wherein a second cleaning member (29) for the mixing chamber (24) is slidably received and protrudes from a longitudinal bore in said spool member (12), said second cleaning member (29) being movable between an advanced and a retracted position in respect to the mixing chamber (24); and

- wherein at least one injection restriction or orifice (31) is performed between the shaped edges at the rear end of mixing chamber (24) and front shaped edges of the second cleaning member (29) for co-injection of the not yet mixed chemical components from the feeding chamber (15) into the mixing chamber (24) of the mixing apparatus.

31. A self-cleaning apparatus according to claim 30, comprising first and second hydraulic actuators (13, 13'; 30, 30') operatively connected to said first and second cleaning members (12, 29) and selectively connectable a fluid source.

32. A self-cleaning apparatus according to claim 30, wherein said hydraulic actuators comprises first and second cylinder-piston arrangements (13, 13'; 30, 30'), each of the said cylinder-piston arrangement comprising a piston chamber (13', 30') and a piston member (13, 30), and wherein the piston chamber (30') of the second cylinder-piston arrangement (30, 30') is provided in the piston member (13) of said first cylinder - piston arrangement (13, 13').

33. A self-cleaning apparatus according to claim 30 comprising a throttling device for throttling the injection orifice (31), said throttling device comprising the second cleaning member (29) for the mixing chamber (24) and adjustable stop means (32) at the retracted position of the second cleaning member (29).